

SEAT MOUNTABLE ENTERTAINMENT SYSTEM

**CROSS-REFERENCE TO RELATED APPLICATION**

5 This application is a Continuation-In-Part of U.S. Application Serial No. 10/438,724, filed on May 15, 2003.

**BACKGROUND OF THE INVENTION**

1. Technical Field:

10 The present disclosure relates to an entertainment system, and more particularly to an entertainment system capable of being mounted to a seat.

2. Discussion of Related Art:

15 As society becomes more mobile and therefore spends a greater amount of time traveling and away from home, demand rises for electronic appliances and devices outside the home environment. For example, as shown in Figures 1 and 2, video screens 101 have been mounted in the headrests 102 of vehicles, 20 facilitating video entertainment on the road. These video screens may be connected to a media source located, for example, in the glove box or console of the vehicle. In this configuration, the media source occupies space in the vehicle that could otherwise be used for alternate purposes, such as 25 storage.

Therefore, a need exists for a configuration of an entertainment system that includes space for housing a media source located on the seat of the vehicle.

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#### SUMMARY OF THE INVENTION

An entertainment system, in accordance with an embodiment of the present invention, includes a media source, and a housing for supporting the media source, wherein the housing is coupled to an inner portion of a seat of a vehicle, and the media source 10 is capable of being selectively connected to and disconnected from the housing.

The media source may include at least one of a DVD player, a CD-ROM player, a video game player, a videocassette player, a television tuner, a radio tuner, an MP3 player, and a digital 15 video recorder. The inner portion of the vehicle seat may include an internal support structure of the seat. The housing may be mounted in one of a headrest and a main body of the seat and may include a cavity for receiving the media source.

The media source includes a wireless transmitter for 20 transmitting wireless signals, wherein the wireless signals include at least one of audio signals and video signals. The media source may include a port for connecting to an external device.

The entertainment system may further include a display operatively coupled to the media source, wherein the display is one of handheld, mounted to the housing and mounted at a location in the vehicle away from the housing. The display may 5 be pivotally mounted to the housing. The location in the vehicle away from the housing may include one of a wall of the vehicle, another seat in the vehicle and a different part of the same seat where the housing is mounted. The display may be operatively coupled to the media source via at least one of a 10 direct connection, a connection through the housing and a wireless connection.

The media source may be electrically coupled to the housing using a pin array. Power may be provided to the media source from a power source coupled to the housing. Video data may be 15 transferred from the media source to the housing for distribution to at least one display. Audio data may be transferred from the media source to the housing for distribution to at least one of at least one speaker and at least one headphone set.

20 The entertainment system may also include a door pivotally attached to the housing with a hinge, wherein the hinge is positioned at a top, bottom or side portion of the door. A display may be mounted on the door. The seat of the vehicle may include an opening in line with a slot in the media source for

receiving a data media to be inserted in the slot. The entertainment system may include a cover for covering the housing. The media source may include a storage device capable of storing at least one of a plurality of audio files and a 5 plurality of video files.

A housing adapted to secure a removable media source to a seat in a vehicle, in accordance with an embodiment of the present invention, includes a means for securing the housing to an internal support structure of the seat; and a means for 10 securing the removable media source to the housing.

The removable media source may include at least one of a DVD player, a CD-ROM player, a video game player, a videocassette player, a television tuner, a radio tuner, an MP3 player, and a digital video recorder. The housing may be 15 mounted in one of a headrest and a main body of the seat. A display may be operatively coupled to the removable media source, wherein the display is one of handheld, mounted to the housing and mounted at a location in the vehicle away from the housing. The display may be operatively coupled to the 20 removable media source via at least one of a direct connection, a connection through the housing and a wireless connection. The removable media source may be electrically coupled to the housing. Power may be provided to the removable media source from a power source coupled to the housing. Video data may be

transferred from the removable media source to the housing for distribution to at least one display. Audio data may be transferred from the removable media source to the housing for distribution to at least one of at least one speaker and at 5 least one headphone set.

Another entertainment system, in accordance with an embodiment of the present invention, includes a media source, and a housing for supporting the media source, wherein at least a portion of the housing is mounted in a vehicle seat, and the 10 media source is capable of being selectively connected to and disconnected from the housing.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Preferred embodiments of the present invention will be 15 described below in more detail, with reference to the accompanying drawings:

Figure 1 is an illustration of a video screen installed in a vehicle headrest;

Figure 2 is an illustration of a video screen installed in 20 a vehicle headrest;

Figure 3 shows an entertainment system according to an embodiment of the present invention;

Figure 4 shows an entertainment system according to an embodiment of the present invention;

Figure 5 shows a housing attached to an internal support structure of a seat according to an embodiment of the present invention;

Figures 6A-6B show mechanisms for installing an entertainment system according to an embodiment of the present invention;

Figures 7A-7B show mechanisms for installing an entertainment system according to an embodiment of the present invention;

Figure 8A shows a housing according to an embodiment of the present invention;

Figure 8B shows a rear portion of a source according to an embodiment of the present invention;

Figure 9 shows an entertainment system according to an embodiment of the present invention;

Figures 10A-10D show an entertainment system according to an embodiment of the present invention; and

Figure 11 shows a cover for an entertainment system according to an embodiment of the present invention.

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#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring to Figure 3, an entertainment system 200 is shown, wherein a housing 202 for a media source 250 is integrated into a vehicle seat 201 at, for example, the main

body 203 of the seat 201. As shown in Figure 4, an entertainment system 300 includes a housing 302 for a media source 350 that is integrated into the headrest 305 of a vehicle seat 301.

5 The media sources 250, 350 may include, for example, a DVD player, a CD-ROM player, a video game player, a videocassette player (VCP), a television or radio tuner, and an MP3 player, digital video recorder (DVR) or similar device capable of downloading, recording, storing (e.g., on a storage device, such 10 as a hard disk) and/or playing video and/or audio files or programs. The media sources 250, 350 may also include any combination of the above media sources. If a media source requires insertion of a data media, such a DVD, the media source can be a clamshell-type device, wherein a data media is inserted 15 into the media source through a cover, for example, positioned on the top of the device (Figure 10D), a slot-type device, wherein a data media is inserted through a slot in the media source, a drawer-type device including a drawer and a spindle for securing a data media in place, or any other device 20 configured to receive a data media.

As shown in Figures 4 and 6A-6B, the housings 202, 302 can be fixed to the vehicle seats 201, 301 by, for example, screws 205, catches 206, adhesives, epoxies and/or any other means known to those skilled in the art. As shown in Figure 4, the

housing 302 can be secured to an internal support structure 325 of the headrest 305. Alternatively, as shown in Figure 5, the housing 202 may be secured to internal structures 225, 226 of the main body 203 of the vehicle seat 201. As an alternative to 5 mounting to an internal support structure, the housings 202, 302 may be attached (e.g., glued or riveted) to a portion of the upholstery within the seat body or headrest.

The media sources 250, 350 can be permanently fixed in a cavity or open portion 210, 310 of the housings 202, 302 by any 10 acceptable means known to those skilled in the art, such as by screws, catches, adhesives, molding and pressure fitting. The media sources 250, 350 are preferably capable of being selectively inserted and mounted in the cavities 210, 310 and removable therefrom. The media sources 250, 350 may be 15 selectively housed in the cavities 210, 310 so that they are replaceable with different media sources operating with the same or different types of media.

Referring to Figure 7A, the housings 202, 302 include a quick release mechanism for securing and releasing the media 20 sources 250, 350. The quick release mechanism can include a button 702 for releasing a latch 703, which is secured to the media source 250, 350 by pressing the media source 250, 350 securely into the cavity 210, 310. A latch mechanism includes a latch 703 that passes into, for example, a bottom portion of a

wall of the media source 250, 350. The latch 703 is momentarily displaced as the media source 250, 350 is inserted into the cavity 210, 310. A spring 704 secures the latch 703 in the bottom portion of the media source 250, 350. The button 702 can 5 be pressed, aligning the latch 703 with an opening in the bottom portion of the media source 250, 350, and the media source 250, 350 can be pulled away from the housing 202, 302.

As shown in Figure 7B, a rear portion 705 of the media source 250, 350 can be secured by a convex portion 706 that fits 10 within a concave portion 707 in the housing 202, 302. As the media source 250, 350 is pressed into the cavity 210, 310, a wall 708 of the housing 202, 302 flexes away from the rear portion of the media source 250, 350 until the convex portion 706 is aligned with the concave portion 707. The convex portion 15 706 and the concave portion 707 cooperate to secure the media source 250, 350 in the cavity 210, 310 of the housing 202, 400. Thus, a wall 708 of the housing 202, 302 surrounding the cavity 210, 310 can be formed of, for example, a flexible thermoplastic rubber. Other means of securing the media source 250, 350 in 20 the cavity 210, 310 of the housing 202, 302 are contemplated, such as, snaps, locks, latches, and the like.

Referring now to Figures 8A and 8B, a wall 815 of the housing 202, 302 bordering the cavity 210, 310 (shown in Figure 8A as a back wall 815) includes a pin array 801 for connecting

to a pin array 802 located on the media source 250, 350. When the media source 250, 350 is secured to housing 210, 310, the pin array 801 and media source pin array 802 transfer data to and from the media source 250, 350. Thus, the media source can 5 be connected to external devices through the housing 202, 302. The external devices include, for example, a slave video display unit installed in another part of the vehicle, a security system, and a vehicle sound system.

The media source 250, 350 may also be connected to the 10 vehicle's power supply through the housing 202, 302. The housing 202, 302 can be coupled to a vehicle's electrical system and connected to a vehicle's power supply, e.g., 12 Volts, through, for example, a wiring harness. Power can be supplied to the media source 250, 350 through the pin arrays 801 and 802. 15 The housing 202, 302 can also be connected to a vehicle's data communication bus, which can carry data to and from the external devices.

Referring to Figure 9, in an entertainment system 400, a portion of a seat 401, such as the headrest 405, includes an 20 opening 409 for receiving a data media to be inserted in the media source (e.g., media source 250 or 350). The opening 409 aligns with the slot 411 of a media source that has been inserted into a cavity in a housing. The alignment of the opening 409 with the slot 411 allows a data media, such as a DVD

or MP3 disk to be inserted into a media source. The opening 409 may be positioned on the side, top, or bottom of the seat 401. The portion of the seat 401 where the media source and slot are located (e.g. the headrest 405 or the main body of the seat) may 5 include vents 412 for dissipating heat and a cooling fan 413 for increasing airflow. The cooling fan 413 can be located behind the vents 412, such that the cooling fan 413 is concealed.

Referring to Figures 10A-10D, another embodiment of an entertainment system 500 installed in a vehicle seat 501, 10 wherein a housing 502 for a media source 550 is integrated into the vehicle seat 501, at, for example, the headrest or the main body of the vehicle seat 501. A display 520 is also attached to the housing 502. Like the housings 202 and 302 and media sources 250 and 350, the housing 502 is attached to the seat 501 15 and the media source 550 is mounted in the housing 502 in the same or similar manner as embodiments shown in Figures 3 and 4. The media source 550 may also include any of the devices listed above in connection with the media sources 250 and 350. Further, the housing 502 may include the pin array 801 for 20 mating with a pin array 802 on the media source 550 for transfer of power and/or data.

As shown in Figures 10A-10D, a door 530 is connected via a hinge or hinges 532 to the housing 502. The door 530 includes the display 520 formed on a front side thereof. The display 520

can be fixed to the door 530 by, for example, screws, catches, adhesives, molding, pressure fitting, snugly fitting into an open center section of the door 530 bordered by a frame and/or any other means known to those skilled in the art.

5       The hinge 532, located at a top portion of the door 530, allows the door 530 to pivot away from the housing 502 to expose a cavity 510 for receiving and supporting the media source 550 in the housing 502. The hinge 532 may be positioned at top, bottom or side portions of the door 530 as long the door 530 can  
10 be opened to expose the cavity 510 for receiving the media source 550.

The media source 550 includes a cover 552 that can be opened to allow insertion of a data media, such as a DVD, into the media source 550. The door 530 may be opened, for example,  
15 by pulling a tab 534. Alternatively, a button (not shown) may be depressed releasing the door 530 from the housing 502. The cover 552 may be opened, for example, by pulling a tab (not shown) and/or by depressing a button 554 releasing the cover 552 from the entertainment unit 550. The door 530 may be closed by  
20 re-engaging the released side of the door 530 with the housing 502. A desired program can be played for viewing while the door 530 is in the closed position. Controls 560 for controlling functions of the media source 550, such as, volume, previous,

next, pause, eject, play and power on/off, are shown in Figure 10D positioned on the media source 550.

The display 520 has a thin display screen, preferably an LCD type screen. Specifications for the display 520 may include 5 a TFD color liquid crystal display with a diagonal length of 4-8 inches, and a full color TFT active matrix display. The display 520 may include a control panel 540 with control buttons 542 for controlling the on screen display characteristics and input and output ports 543 for items such as external devices or 10 headphones. The media source 550 may also include input and output positioned thereon.

It is to be appreciated that that a display, such as the display 520, may also be attached to the housings 202, 302, either via a door or directly to the housings using fasteners, 15 screws, catches, molding, snap-fit mechanisms or the like. A display may also be handheld, mounted in another portion of the vehicle away from the seat mounted media source, such as to a wall of the vehicle (e.g. the ceiling of the vehicle), on another seat or on a different portion of the same seat as the 20 media source (e.g., on a headrest, while the media source is positioned on the main body of the seat).

The display can be operatively coupled to the media source directly via wires or some other electrical connectors, or

through the housing, via, for example, electrical connectors coupled to the pin array 801.

Transfer of data may be obtained through the pin arrays 801, 802. For example, video data from a DVR media source may 5 be transferred through the pin arrays 801, 802 to a display coupled to the housing for producing a video image on a display screen. Similarly, audio data may be transferred through the pin arrays 801, 802 to a display, speakers and/or headphones coupled to the housing for producing sound associated with a 10 video image. Further, audio data may be sent through the display to speakers or headphones via wired or wireless transmission. Video and audio data may also be transferred to displays, speakers and/or headphones directly from the media source. Audio and/or video data from any of the above described 15 media sources can be transferred via the pin arrays 801, 802 or through some other physical connection, such as wires or through wireless transmission to displays, speakers and/or headphones.

To provide for audio reception through wireless headphones, the display 520 or the media source 550 may include a wireless 20 transmitter 575 for transmitting wireless signals to wireless receivers in wireless headphones via, for example radio frequency (RF) or infrared (IR) signals, using an antenna or optical transmitting device, respectively. The wireless transmitter 575 can be capable of transmitting wireless signals

over more than one channel operating at a different frequency for each channel so that interference between more than one wireless headphone user watching different programs can be avoided. Audio may also be provided to vehicle occupants 5 through the existing vehicle audio system or through a speaker mounted in the seat 501 or media source 550.

Referring to Figure 11, when the entertainment systems 200-500 are not in use, a cover 980 can conceal the housing and cavity. The cover 980 is manufactured from a material such as, 10 plastic, wood, leather, vinyl, cloth, and/or aluminum. Depending on the cover material, the cover 980 can be secured by the same mechanisms used to secure the media source to the compartment shown in Figures 7A-7B, or with catches, snaps, Velcro, and/or a zipper. The cover 980 and the media source can 15 have one or more features in common, such as openings for receiving latches and the like.

It is to be appreciated that a portable media source according to the present invention is easily removable from and can be operated outside of a vehicle, for example, in home or 20 office environments.

Having described embodiments for a seat mountable video system, it is noted that modifications and variations can be made by persons skilled in the art in light of the above teachings. It is therefore to be understood that changes may be

made in the particular embodiments of the invention disclosed which are within the scope and spirit of the invention as defined by the appended claims. Having thus described the invention with the details and particularity required by the 5 patent laws, what is claimed and desired protected by Letters Patent is set forth in the appended claims.